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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,473	02/11/2004	Daniel James Branagan	NANO002U	4069

32047 7590 04/08/2005

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EXAMINER	
MAI, NGOCLAN THI	
ART UNIT	**PAPER NUMBER**
1742	

DATE MAILED: 04/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/776,473	BRANAGAN, DANIEL JAMES	
	Examiner	Art Unit	
	Ngoclan T. Mai	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 5-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Masumoto et al (US Patent 3,986,867).

Masumoto et al discloses an iron-chromium series amorphous alloys having high heat resistance and corrosion resistance consisting essentially of 1-40 atomic % of Cr, 7-35 atomic % of at least one of carbon, boron, and phosphorous and the remainder being iron, wherein part of the iron may be substituted with at least one component including Ni, Co, Mo, Zr, Ti, Mn, V, Nb, W, Ta and Cu, see abstract or col. 2, lines 8-35. Masumoto et al teaches that the alloy can be formed by adding at least one of C, B and P element to Fe-Cr series alloy, melting the mixture and quenching into strip, ribbons, foil, powder or thin sheet. Col. 2, lines 41 - col. 4, line 4. Note that the melting and quenching reads on the combining step and mixing step of claims 6 and 7. Since C, B and P are added to Fe-Cr alloy in the amounts within the claimed range, their presences inherently reduce the thermal and/or electrical conductivity of the metal alloy composition and decrease the free electron density of the base metal.

3. Claims 1-3 and 5-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Dickson et al.

Dickson et al discloses a chemically homogeneous microcrystalline powder comprising 5 to 30 at. % B containing alloy based in Fe, Ni, Co, or combination thereof. Dickson et al teaches that other metalloid Si, C, P, Al and Ge may be substituted for some of the B and additions such as Cr and Cu can be added to enhance the corrosion resistance of the alloy, while Mo, W, Mn, V and Ti will tend to increase the strength of the alloy, Col. 2, lines 32-53. Dickson et al teaches that the alloy is formed by casting the metal components and fragmenting the cast material into powder. Note that the casting reads on the claimed mixing step and combining step of claims 6 and 7. Since boron and its substitute are added to the alloy based in Fe, Ni, Co or combination thereof in the amounts within the claimed range, their presences inherently reduce the thermal and/or electrical conductivity of the metal alloy composition and decrease the free electron density of the base metal.

4. Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Ray (US Patent Nos. 4,067,732, 4,290,808 and 4,523,621) or Bose et al (US patent 4,515,870).

Ray '732 discloses an iron group-boron base amorphous alloys having the formula $M_aM'_bCr_cM''_dB_e$ where M is one of iron group element (iron, cobalt or nickel), M' is at least one of the other two remaining iron group elements, M" is at least one element of V, Mn, Mo, W, Nb and Ta, a ranges from about 40-85 atom percent, b

ranges from about 0-45 atom percent, c and d both range from 0 to 20 atom percent and e ranges from about 15-25 atom percent, with the proviso that b, c and d cannot all be zero simultaneously, abstract. Ray '732 teaches B as the P-group alloying element, which is present in the alloy in the amount of 16 atomic %, col. 4, lines 59-64. The alloys taught are formed by melting the desired composition following by quenching into desired shape, col. 5, line 39 to col. 6, line 4.

Ray '808 discloses metallic glass powders having the composition $Ni_{45}Co_{20}Cr_{10}Fe_5Mo_4B_{16}$ and formed by rapidly quenching a melt to obtain splats or filament of amorphous metal, annealing to effect embrittlement and milling to form powder, col. 1, line 46 to col. 4, line 31.

Ray '621 discloses metallic glass powders having the composition $Ni_{45}Co_{20}Cr_{10}Fe_5Mo_4B_{16}$ and formed by atomizing a jet of molten glass having the composition and chilling, col. 11, line 42 to col. 12, line 21.

Bose et al discloses a homogeneous ductile iron based hardfacing foil having the composition $Ni_{35}Ni_{10}Cr_{10}B_{16}Mo_4Co_{25}$ and $Fe_{35}Ni_{10}Cr_{15}B_{16}Mo_4Co_{20}$ formed by melting the requisite elements of the desired composition and quenching the composition on a chill surface to form ribbon, wire, sheet, etc. See col. 3, lines 28-58.

Note that the melting and quenching reads on the claimed mixing step and combining step of claims 6 and 7. Since boron is added to metal alloy in the amounts within the claimed range, its presences inherently reduce the thermal and/or electrical conductivity of the metal alloy composition and decrease the free electron density of the base metal as applied to claims 7-8.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dickson et al

Dickson et al discloses the metal alloy powder comprising B as the p-group alloying element in the amount claimed by the applicant. The difference is that Dickson et al does not specifically teach employing B at 16 at.%. However it would have been obvious to one of ordinary skill in the art to select any portion of range, including the claimed range, from the broader range disclosed by Dickson et al. because *Dickson et al.* finds that boron in the entire disclosed range has a suitable utility. --- Note: Even if a reference teaches a preferred range within a broader range, it still does not "teach away" from the claimed invention. See MPEP 2123.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoclan T. Mai whose telephone number is (571) 272-1246. The examiner can normally be reached on 9:30-6:00 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ngoclan T. Mai
Primary Examiner
Art Unit 1742

n.m.